

**NURSES' COMPLIANCE IN USING MODIFIED NEONATAL VENTILATOR
ASSOCIATED PNEUMONIA (VAP) PREVENTIVE CARE
BUNDLE FOR NEWBORNS**

**BY
NEEMA JOHN**

**A DISSERTATION SUBMITTED TO THE TAMILNADU DR.M.G.R
MEDICAL UNIVERSITY, CHENNAI, IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE IN NURSING**

OCTOBER 2017

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DECLARATION

I hereby declare that the present dissertation entitled **“Nurses' Compliance in Using Modified Neonatal Ventilator Associated Pneumonia(VAP) Preventive Care Bundle For Newborns ”** is the outcome of the original research work undertaken and carried out by me under the guidance of **Dr. Latha Venkatesan, M.Sc (N)., M.Phil (N)., Ph.D (N)., M.B.A(HM), Ph.D (N)(HDFS)., ,** Principal cum Professor, Apollo College of Nursing and **Prof. Nesa Sathya Satchi, M.Sc (N)., HOD, Child Health Nursing Department, Apollo College of Nursing, Chennai.** I also declare that the material of this has not found in any way, the basis for the award of any degree or diploma in this university or any other universities.

NEEMA JOHN

M.Sc (N) II YEAR

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SYNOPSIS

“A Study to Assess the Nurses’ Compliance in Using Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle for Newborns at Selected Hospitals, Chennai”.

The Objectives of this Study were,

1. To assess the Compliance of nurse’s in using Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle for newborns.
2. To find out the association between Compliance of nurses in using Ventilator Associated Pneumonia(VAP) Preventive Care Bundle and selected demographic variables of the nurses.
3. To determine the incidence of Ventilator Associated Pneumonia after Implementing the use of Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle.

The conceptual framework for the study was developed on the basis of the Modified Kurt Lewins Change Model (1947), which has been modified for the present study. An intensive review of literature and guidance from experts laid the foundation for the development of tools such as demographic variable proforma of the newborns and nurses who were taking care of the ventilated babies and Modified Neonatal VAP Preventive Care Bundle Checklist.

In this study descriptive co-relational research design was adopted for nurses who were taking care of the ventilated babies. The present study was

conducted at Apollo Cradle Hospital, Chennai, among 30 nurses who were taking care of the ventilated babies.

The researcher used the demographic variable proforma to get the baseline information relating to the nurses. Clinical Variable Performa was used for the assessment of newborns. Observational checklist was used for the assessment of the practice of nurses. The data collection tools were validated and reliability was established. Data collection for the main study was conducted for a period of six weeks. The collected data was tabulated and analyzed using appropriate descriptive and inferential statistics.

The Major Findings of the Study

- ✓ More than half of the nurses were aged 25 years and above (56.67%), qualified with B.Sc (N) (73.33%) with total experience as a staff nurse between 3 – 5years (36.66%) majority of nurses had no previous experience on VAP bundle (90%).
- ✓ All the child births were Caesarean section (100%) with a birth weight of <2.5 kg (100%). All newborns didn't cry at birth (100%), they had APGAR score of <7 (100%).
- ✓ Most of the newborns were ventilated for RDS 7(70%), were on ventilator for about 5days (80%), in SIMV mode (90%).
- ✓ All the nurses had partial Compliance in Implementing Modified Neonatal VAP Preventive Care Bundle (100%) on day 1 and day 2. On day 3, (16.66%) nurses were complaint and (80%) were partially complaint.
- ✓ The mean and standard deviation of Compliance of nurses was found to be higher on the third day of Implementation of Modified Neonatal VAP

Preventive Care Bundle (M- 36.2 & SD-3.58) in comparison with day 1 (M 33.56 & SD-8.6) on day 1 and day 2 (M 35.8 and SD- 3.06).

- ✓ Chi square test was used to find out the association between selected background characteristics and the Compliance of nurses in using Modified Neonatal VAP Preventive Care Bundle for newborn on day 1, 2 and 3, it was inferred that there was no significant association between selected background characteristics and Compliance of nurses in using Modified Neonatal VAP Preventive Care Bundle for newborn in day 1, 2 and 3 at ($p > 0.05$).

There was a significant association between the previous experience of nurses ($\chi^2 = 5.75$, $df=1$) and the compliance of nurses who were using Modified neonatal VAP Bundle for newborn at ($p < 0.05$) level. However there was no significant association between other background characteristics like age, professional qualification, total years of experience as staff nurse and exposure to In-service education regarding VAP Bundle. Hence, the hypothesis there will be no significant association between Compliance of nurses on using Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle and selected background variables of the nurses was retained except with regard to previous experience of nurses.

- ✓ The findings revealed that there was no incidence of Ventilator Associated Pneumonia (VAP) after implementation of Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle for newborns.

Recommendations

- ✓ A similar study could be undertaken on larger scale for more valid generalization.
- ✓ The present study could be replicated in different settings.
- ✓ A comparative study can be done using different VAP Bundle practice checklist.

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CHAPTER 1

INTRODUCTION

Background of the Study

“In the womb, humans are free of microbes. Colonization begins during the journey down the birth canal, which is riddled with bacteria, some of which make their way onto the newborn’s skin”

- *Robin Marantz Henig*

A newborn baby is a blessing to their parents. The parents has lot of expectations about the newborn baby. Parents spend their most of the time taking care of the baby. Any illness in the baby will bring disharmony in the family. Hospitalization is a stressful, overwhelming and exhausting event for all involved with the care of the newborn, the parents, siblings, grandparents and for family friends. When a newborn is in Neonatal Intensive Care Unit (NICU) it is difficult time for the family. So, the nurses have the responsibility of taking care of newborn baby as well as the family.

Children are the future of our society and special gifts to the world. Children are very special people in the lives of their parents. Parents spend much of their life in meeting the needs of the children giving them love, protection and support. Children are great assets of the Nation. Children are physically, physiologically and emotionally immature and different from adults. The child is smaller with immature systems and fewer reserve (Marlow, 2012).

Newborn babies constitute the foundation of a nation and no sensible government can afford to neglect their needs and rights. Healthy and sturdy babies are likely to evolve as physically and mentally strong adults with enhanced

quality of human resource development. Neonatal deaths account for almost two-third of all infant deaths and 40% of all under 5 deaths. In India optimal prenatal care with improved survival of infants is essential for effective fertility control and stabilisation of population dynamics.

Newborn infants are unique in their physiology and the health problems that they experience. Neonatal period is characterised by transition to extra uterine life and rapid growth and development. This phase in life has the greatest risk of mortality .It is also the most critical period for long term physical and neuro cognitive development. (Paul & Bagga, 2010)

Neonatal care is highly cost effective because saving the life of a newborn baby is associated with survival and productivity for over 5 decades as opposed to the intensive care of adults with cancer and the degenerative disorders which is associated with an average survival for 2-5 years. The World Bank has estimated that the burden of disease contributed by perinatal causes in India accounts for 25 percent of the Global Disability Adjusted Life Years (DALY) loss to the society. The Millennium Development Goal (MDG 4) of reducing under 5 mortality by two-third or 3/8 by 2015 cannot be achieved unless there is significant reduction in neonatal mortality (Singh, 2010)

Ventilator associated pneumonia (VAP) in mechanically ventilated patients is that which develops later than or at 48 hours after the patient has been placed on a mechanical ventilator (Centre for disease control and prevention ventilator associated pneumonia event, 2012). VAP is the second most common Hospital acquired infection among Paediatric Intensive Care Units (PICU) and Neonatal Intensive Care Unit (NICU) patients. Data from the CDC (Centres for

Disease Control) National Nosocomial Infections Surveillance System has indicated a mean Paediatric Intensive Care Unit (PICU) Ventilator associated pneumonia (VAP) rate of 2.9 per 1000 ventilator days. Ventilator Associated Pneumonia increases morbidity and overall mortality and prolongs the hospital length of stay. Ventilator Associated Pneumonia is especially associated with prematurity, low birth weight, chronic lung disease and prolonged (Badrma, 2011).

The risk of Ventilator Associated Pneumonia is greater for intubated children than for intubated adults – the associated causes due to variation in devices like uncuffed endotracheal tubes, nasally placed endotracheal tubes, open – circuit suctioning, use of physiological saline during suctioning and developing teeth. The use of oral endotracheal and orogastric tubes is recommended with a reported reduced rate of sinusitis and possible (Brilli, 2008).

Ventilator Associated Pneumonia is relatively common in mechanically ventilated children but there is a wide variation in reported VAP rates, depending on settings and geographical regions. The incidence of Hospital Acquired Infection (HAI) in adults and PICUs is high. This is also due to the many invasive procedures and frequent use of antibiotics, which put the patients at risk for infection and promote the emergence of multidrug- resistant organisms.

Ventilator-associated pneumonia is linked to increased morbidity, mortality and length of stay in the hospital and intensive care unit, adding tremendously to health care costs. Prevention is the most appropriate intervention, but very little research has been done in India among children to identify

necessary skills and strategies. Critical care nurses play an important role in identification of risk factors and prevention of ventilator-associated pneumonia.

A care bundle based on factors, including evidence regarding the pathophysiology and aetiology of pneumonia, mechanical ventilation, duration of ventilation, and age of the child, can offer prompts and consistent prevention strategies for providers caring for children in the paediatric intensive care unit. The following the recommendations of the Centres for Disease Control and Prevention and adapting an adult model also can support this endeavour.

Need for the Study

Indian ICU data reveals VAP rate of 6.74/1000 ventilator days, in contrast to Centre for disease Control/ National Health Care Safety Measures of 1.43 and International Nosocomial Infection Control Consortium of 19.5 (Singh & Chakravarthy, 2014). Healthcare associated infections (HAI) include those relating to morbidity, mortality and prolonged hospitalization and represent a serious threat to patient safety. Hospitalized children are particularly vulnerable population (Kleven, 2012).

Worldwide, about 15 million infants are born premature each year. Technological advances, including invasive mechanical ventilation, play a major role in the survival of extremely preterm babies. Those who survive may have prolonged morbid conditions that result in long- term sequelae. Nurses face several challenges during the hospitalization of these infants. Vigilant care, monitoring and careful handling of the infants can prevent infections and long-term complications. Newer, less invasive technologies are promising for improved outcomes in extremely preterm infants.

Approximately 150 million episodes of childhood pneumonia are reported every year from the world, out of which 95% are from developing countries. Fifteen countries account for nearly 75% and 6 countries including India account for 50% India alone bears the brunt of 25% disease burden. Out of the 7.6 million under five childhood mortality world over 16%, 12 million deaths are due to pneumonia. More than 90% of deaths due to pneumonia are among young children which occurs in 68 poor nations, mostly from Africa and Asia. In India, the disease burden is huge. The 45 million episodes are estimated annually with 6.6 million hospitalizations, which contribute to 24% national disease burden and 0.37 million deaths annually (Parthasarathy, 2007).

Mechanical ventilation of the neonate is a complex, and often highly invasive procedure. It should not be undertaken in a casual manner. In addition the clinician must understand the basic mechanical principles of the specific ventilator in use and anticipate how the patient will respond to the changes in ventilator performance that are made by the operator. The beneficial effects of ventilator therapy are dependent on a strong knowledge of these subjects, skill and experience in management combined with constant vigilance by medical, nursing and respiratory personnel during treatment (Kerotkin, 2011).

VAP occurs in 9% to 27% of all intubated patients, with 50% of the occurrences developing within the first four days of mechanical ventilation. In addition, patients who develop VAP have significantly longer hospital stays and higher mortality rates than those who do not develop VAP (Kollef, 2004). Samransamruajkit et al in 2010 found that Ventilator Associated Pneumonia was 13.9 cases per 1000 ventilator days for circuit changes every 3 days and 11.5 cases

per 1000 days for circuit changes every 3 days to a 7 day ventilator circuit policy could save a PICU \$22000 annually in medical supplies and labour costs. In addition, a 7 day circuit change tends to decrease PICU length of stay and mortality rate. Ventilator associated pneumonia remains a serious and mainly unsolved problem among paediatric and neonatal intensive care units (Foglia, 2007).

World Health Organisation (WHO, 2001) lists a few causes of neonatal deaths, infections (tetanus, sepsis, pneumonia, and diarrhoea), 32% complication of prematurity, 24% birth asphyxia 29%, congenital anomalies 10% and others 5%. Newborn mortality is one of the world's most neglected health problems. It is estimated that globally 4 million newborn die before they reach one month of age and another 4 million are still born each year. Deaths during the neonatal period (the first 28th days of life) accounts for almost two thirds of all deaths in the first year of life and 40% of deaths before the age of five (Ghai,1988). A surveillance study from the International Nosocomial Infection Control Consortium (INICC) has identified higher Ventilator Associated Pneumonia rates in academic compared to non-academic hospitals (Rosenthal, 2012).

The Centre for Disease Control (CDC) suggests the implementation of a comprehensive oral hygiene regimen for all patients to manage the risk for VAP and other health care associated pneumonias (Seckel 2007, Tablan 2003).Circuit changes should be minimal in infants and children and should be done only when the tubing is visibly internally soiled or is malfunctioning. Minimal manipulation of patients and tubing may assist in decreasing contamination and subsequent pneumonia (American Association of Critical Care Nurses, 2013). Bundles used

to implement evidence-based clinical best practice guidelines are effective when implemented on a nursing unit (Zilberberg, 2009).

VAP is well documented in the adult population in terms of both mortality and morbidity. Prevention of VAP is one of the key high-impact intervention priorities in the 'Saving Lives' initiative instituted by the Department of Health in general ICUs in 2005. In Paediatric Intensive Care Unit, this is an area that receiving the attention only in the recent past. Many centres have introduced care bundles (extrapolated from the adult care bundle) aimed at reducing the incidence of VAP (Dixon & Crawford 2012).

The newborn on mechanical ventilator are high risk babies. They should be given care with aseptic techniques. In NICU, nurses play a major role in providing quality health care to the baby. Hence the development of Ventilator Associated Pneumonia (VAP) Preventive Care bundle will be beneficial for nurses as well as for neonates.

As a nurse, the researcher has found adults are having separate VAP Bundles in the Intensive Care Units and is effective for the adult patients but there is no separate bundle for newborns. Children are different from adults. They have less immunity to fight against infections in the hospital. The nurses should provide special care to the children to prevent nosocomial infections. In India, there is no separate VAP preventive care bundle for newborns and there is incidence of VAP in neonates. Hence, the researcher has undertaken this study to assess the compliance of nurses' in using Modified Neonatal Ventilator Associated pneumonia preventive care bundle while caring for ventilated newborns.

Statement of the Problem

A Study to Assess the Nurses' Compliance in using Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle for Newborns at Selected Hospitals, Chennai.

Objectives of the Study

1. To assess the compliance of nurses in using Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle for newborns.
2. To find out the association between the compliance of nurses in using Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle and selected demographic variables of the nurses.
3. To determine the incidence of Ventilator Associated Pneumonia after Implementing the use of Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle.

Operational Definitions

VAP (Ventilator Associated Pneumonia)

Ventilator Associated Pneumonia is a type of lung infection that occurs in persons who are on breathing machines in hospitals. As such, Ventilator Associated Pneumonia typically affects critically ill ventilated persons who are in the Intensive Care Unit .VAP is a major source of increased illness and fatal on many occasions (Wikipedia.org).

In this study, Ventilator associated pneumonia refers specifically to Nosocomial bacterial pneumonia that is developed in children who are receiving mechanical ventilation in NICU.

Preventive Care Bundle

A bundle is a structured way of improving the processes of care and patient outcomes: a small, straight forward set of evidence-based practices generally three to five that, when performed collectively and reliably, have been proven to improve patient outcomes.

In this study, Preventive care bundle refers to a set of guidelines for preventing ventilator associated pneumonia in newborns. It consists of three components with 18 items, in which 7 items are core measures, 7 items are equipment related measures and 4 items are general measures. Participants were asked to tick in the appropriate column in the checklist in every shift for 3 days.

Compliance

The act or process of doing what you have been asked or ordered to do: the act or process of complying (Merriam- Webster's Learner's Dictionary).

In this study, it refers to the implementation of Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle by the nurses as measured by the compliance checklist developed by the investigator.

Newborn

A newborn infant or neonate is a child under 28 days of age (WHO).

In this study, newborn is a child under 28 days of age who is on Mechanical Ventilator in NICU of Apollo Cradle Hospital, Chennai.

Assumptions

The study assumes that

- VAP is one of the complications among ventilated newborns.
- Newborns in ventilators require specific care to prevent complication.
- VAP is preventable.
- VAP has increased mortality and morbidity rates.

Null Hypothesis

H₀1: There will be no significant association between compliance of nurses using Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle and selected demographic variables of the nurses.

Delimitations

The study has been limited to the nurses who were

- ✓ Working at Apollo Cradle Hospital, Chennai.
- ✓ Able to understand English.

Conceptual Framework for the Study

Interrelated concepts or abstractions assembled in a rational and often explanatory scheme to illuminate relationships among them are called Conceptual framework (Polit & Beck 2012).

The conceptual framework of the present study is based on Modified Kurt Lewins Change Model (1947). Within the context of this theory, the goal of nursing is defined as motivating individuals and groups of nurses to attain, maintain, or re-establish the use of Modified Neonatal VAP Preventive Care bundle. Therefore, the nurse acts as an agent of positive change to support and

encourage nursing care for pursuit of essential care of the newborn which is the ultimate goal of nursing.

Modified Kurt Lewins Change Model is derived from a larger conceptual model and does not seek to explain or conceptualize the entire human experience but rather serves as a bridge between a larger conceptual framework and the practice level of nursing. Kurt Lewin has developed a change model involving three steps: unfreezing, changing and refreezing.

The model is very simple and practical for understanding the change process. The process of change entails creating the perception that a change is needed, then moving toward the new, desired level of behaviour and finally, solidifying that new behaviour as the norm. The model is still widely used and serves as the basis for many modern change models.

UNFREEZING

Before a change can be implemented, it should go through the initial step of unfreezing. This is because many people naturally resist change, the goal during the unfreezing stage is to create an awareness of how the status quo, or current level of acceptability, is hindering the nursing care in some way. Old nursing care, ways of thinking, processes, nurses and procedures must all be carefully examined to show nurses how necessary a change is for the nursing care to create or maintain a competitive advantage in the NICU. Communication is especially important during the unfreezing stage so that nurses can become informed about the imminent change, the logic behind it and how it benefits each newborn. The idea is that the more nurses are aware of a change of the Modified

Neonatal VAP Preventive Care bundle for Newborn and the more nurses feel it is necessary and urgent, the more motivated to accept the change.

CHANGING

Now that the nurses are 'unfrozen', they can begin to move. Lewin recognized that change is a process where the nursing care must transition or move into this new state of being. This changing step, also referred to as 'transitioning' or 'moving,' is marked by the implementation of the change. This is where the change becomes real. It is also, consequently, the time that most nurses struggle with the new reality. It is a time marked with uncertainty and fear, making it the hardest step to overcome. During the changing step, nurses begin to learn the new Modified Neonatal VAP bundle, processes and ways of thinking. The more prepared they are for this step, the easier it is to complete. For this reason, education, communication, support and time are critical for nurses as they become familiar with the change. Again, change is a process that must be carefully planned and executed. Throughout this process, nurses should be constantly reminded of the reasons for the change and how it will benefit newborn once fully implemented.

REFREEZING

Lewin called the final stage of his change model freezing, but many refer to it as refreezing to symbolize the act of reinforcing, stabilizing and solidifying the new state after the change. The changes made to nursing care, goals, structure, offerings or nurses are accepted and refrozen as the new norm. Lewin found the refreezing step to be especially important to ensure that nurses do not revert back to their old ways of nursing care or doing prior to the implementation of the

change. Efforts must be made to guarantee the change is not lost; rather, it needs to be cemented into the nursing care and maintained as the acceptable way of thinking or doing.

Positive outcomes of Modified Neonatal VAP Bundle acknowledged with individualized nursing efforts are often used to reinforce the new state because it is believed that positively reinforced nursing care will likely be repeated

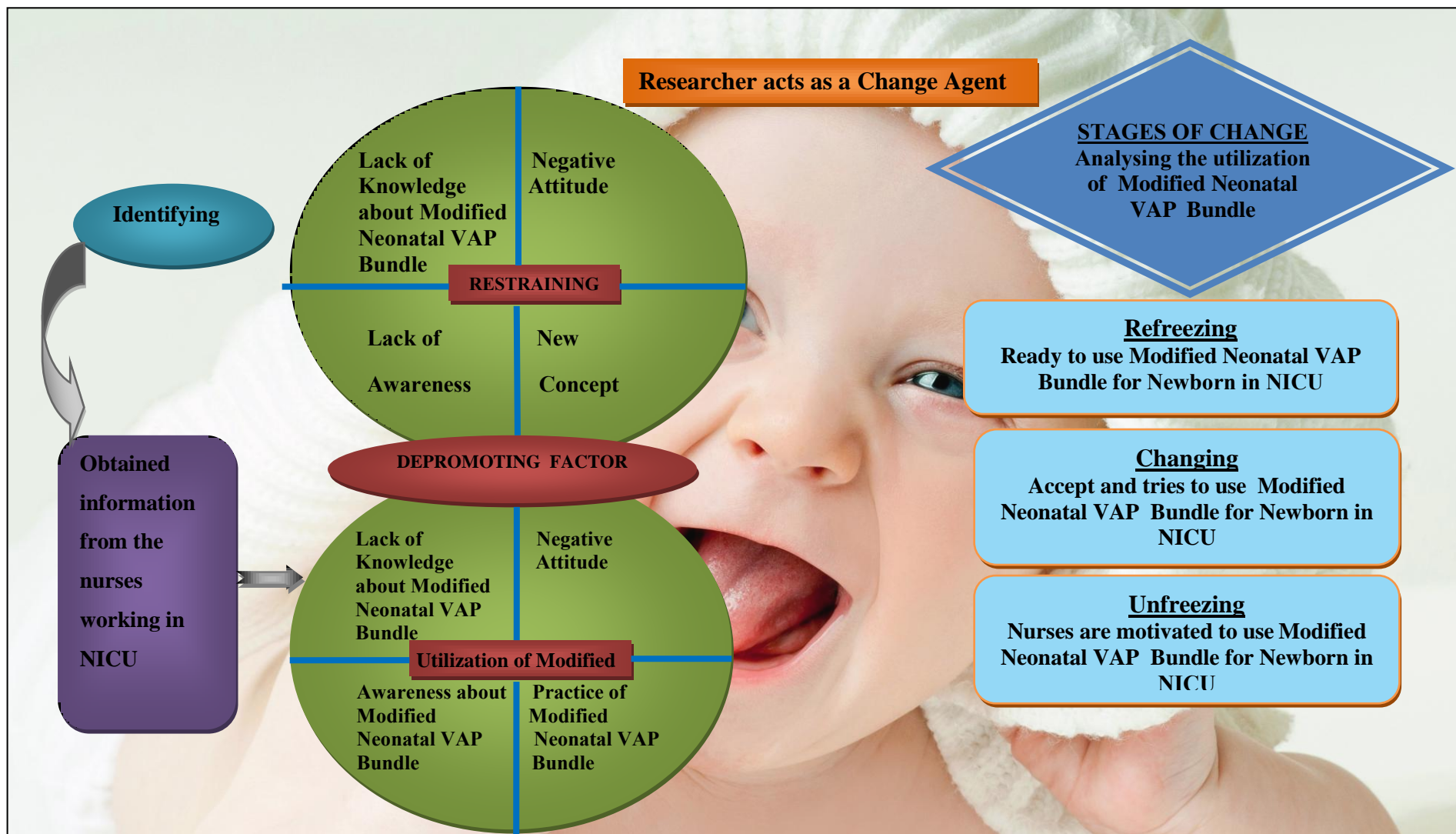


Fig 1 : Conceptual Framework Based on Modified Kurt Lewin's Change Model (1947)

Projected Outcome

Thus, the expected outcome of this study is that the use of an observational checklist for assessment of nurses using VAP Preventive care bundle, can reduce the incidence of Ventilator Associated Pneumonia among newborns and help the staff nurses to document the assessment findings effectively.

Summary

This chapter has dealt with the background, need for the study, and statement of the problem, objectives, operational definitions, assumptions, null hypotheses, delimitations and conceptual framework.

Organization of the Report

Further aspects of the study are presented in the following five chapters.

- | | | |
|----------------------|---|---|
| CHAPTER – II | : | Review of literature |
| CHAPTER – III | : | Research methodology includes research approach, research design, setting, population, sample, sampling techniques, tool description, content validity and, reliability, of tools, pilot study, data collection procedure and plan for data analysis. |
| CHAPTER – IV | : | Analysis and interpretation of data |
| CHAPTER – V | : | Discussion |
| CHAPTER – VI | : | Summary, conclusion, implications and recommendations. |

CHAPTER-II

REVIEW OF LITERATURE

A review of literature involves the systematic identification, location, scrutiny and summary and written material that contain information on the research problem (Polit & Beck, 2012).

The task of reviewing literature involves the identification, selection, critical analysis and reporting of existing information on the topics of interest. A review acquaints the researcher with what has been done in the field and it minimizes possibilities of unintentional duplications. It justifies the need for replication provides the basis of future investigations and help to relate the findings of one study to another.

The relevant and important reviews gathered for this study were categorized under following headings.

- ✓ Neonatal Infections in NICU
- ✓ Ventilator Associated Pneumonia Preventive Care Bundle.

Neonatal Infections in NICU

Kasim et al. (2014) had conducted a study on Nosocomial Infections in a Neonatal Intensive Care Unit. It was a prospective cohort which recruited 300 neonates admitted in NICUs, Al- Azhar University Hospital, Cairo, Egypt. The data was recorded and analyzed using appropriate statistical methods, the Nosocomial infection rate in NICUs was found to be 20%.The conclusion was that the rate of infection was in infants with low birth weight. Pneumonia and

blood stream infections were the most common types of infection (32.9% and 26.8%) respectively, while meningitis was the least (1.2%).

A study on the prevalence of early onset neonatal infection among newborns of mothers who had bacterial infection or colonization: a systematic review and meta-analysis was conducted by Chan et al (2015). Seven of the studies (5.7%) were from very high neonatal mortality settings. The conclusion was that the prevalence of early onset neonatal infection is high among newborns of mothers with infection or risk factors for infection.

In Bosnia and Herzegovina a single centre study in a Neonatal intensive care unit was conducted on Bacterial sepsis in neonates by Softic et al (2010). The aim of the study was to evaluate the incidence, mortality, risk factors, aetiology and the susceptibility to antibiotics of the bacteria responsible for sepsis. Neonatal sepsis in the NICU showed a high incidence rate, with predominance of gram-negative bacteria. Low gestational age, mechanical ventilation and intra-vascular catheter were significantly associated with sepsis. It is necessary to develop a multidisciplinary approach for routine surveillance of nosocomial infections, to improve the asepsis of therapeutic procedures, and to implement the more appropriate use of antibiotics.

In 2017, Softic et al wrote an article on serious bacterial infections in neonates: improving reporting and case definitions. Neonatal infections affects about 7 million neonates causing over 600 000 deaths every year. Estimating the burden is challenging as there are multiple reporting criteria and definitions for serious bacterial infections in neonates. The essential criteria for reporting serious neonatal bacterial infections have recently been published as the STROBE-NI

checklist and, in the context of maternal vaccination; definitions have been published by the Brighton Collaboration Global Alignment of Immunization safety Assessment in pregnancy (GAIA) project. Standardisation of reporting criteria is essential to allow comparability to data. This is an important step in providing a clear picture of the burden of serious bacterial infections in neonates.

Fischer et al (2010) reported an incidence of VAP of 9.6% in a neonatal and pediatric population after cardiac surgery and found a delay in extubation of 3.7 days attributable to VAP.

The practice recommendations for oral hygiene in intubated children in the PICU published by Johnstone et al (2010) include protocols for 3 separate age groups: neonates and infants with no teeth, infants and children less than 6 years old with teeth, and children 6 years or older with teeth. With proper staff education and implementation, use of an oral care protocol, as a part of a larger VAP prevention bundle, may lead to lower rates of VAP in children.

Ventilator Associated Pneumonia Preventive Care Bundle

In November 2013, a study was conducted by Qi Zhou et al on the topic “Efficacy of an infection control program in reducing ventilator-associated pneumonia in a Chinese neonatal intensive care unit”. Among the 491 patients receiving mechanical ventilation, 92 (78.7%) developed VAP corresponding to 27.33 per 1000 ventilator days. The rate decreased from 48.84 per 1000 ventilator days in phase 1 to 27.73 per 1000 ventilator days in phase 2 and further diminished to 18.50 per 1000 ventilator days in phase 3 ($p < 0.01$). Interventions to be described include reducing the time patients spend mechanically ventilated, technical features of the endotracheal tube (ETT) and other mechanical

considerations, and infection-control measures such as oral care and selective digestive decontamination.

A study on “Prevention of ventilator-associated pneumonia in the intensive care unit: A review of the clinically relevant recent advancements was conducted by Keyt et al (2014). They recommend consideration of a multidisciplinary strategy for the care providers incorporating the following: NPPV when able; sedation and weaning protocols for those patients who require mechanical ventilation; mechanical ventilation protocols including head of bed elevation and oral care; and removal of sub-glottic secretions.

Jena et al (2015) conducted a study on Comparison of suction above cuff and standard endotracheal tubes in neurological patients for the incidence of Ventilator Associated Pneumonia and in- hospital outcome: A randomized controlled pilot study. This study made a comparison of the incidence of VAP with standard endotracheal tube (SETT) and suction above cuff endotracheal tube (SACETT) in neurologically ill patients and its impact on clinical outcome. Neurologically ill Fifty – four patients were analysed. The conclusion was the absence of any difference in the incidence of clinical and microbiological VAP between SETT and SACETT.

A study on “Efficacy of an infection control program in reducing ventilator-associated pneumonia in a Chinese neonatal intensive care unit” was conducted by Kim-peng lim et al (2015). A total of 28,454 SICU (Surgical Intensive Care Unit) patients were analysed in this study and the VAP density had remarkably decreased from 3.3 to 1.4 cases per 1000 ventilator days ($p < 0.001$). It

was concluded that implementation of VAP Bundle care decreases the incidence of VAP at SICU.

Edwin (2016) conducted a study on the effect of nursing practice standards on the knowledge and practice of nurses regarding selected nursing care activities and the outcome for children on ventilators in Paediatric Intensive Care Unit of CMC, Vellore. The study shows that Nursing Practice Standards (NPS) education programme was effective in terms of increasing the knowledge and practice of nurses, improving outcome of children on ventilators and in increasing satisfaction of parents.

A hospital – based prospective cohort study was done by Galal et al (2016). The study aimed at determining the incidence, risk factors and outcome of Ventilator Associated Pneumonia (VAP) in the Paediatric Intensive Care Unit (PICU) at Cairo University Hospital, Egypt. Four hundred and twenty seven paediatric patients were enrolled for the study. The incidence density of VAP was 21.3 cases per 1000 ventilator days. Pei-Lun Lee (2017) conducted a study Ventilator-Associated Pneumonia among Low Birth Weight Neonates in Neonatal Intensive Care Unit: A Retrospective Observational Study. Six hundred and five LBW infants (<2.5kg) were admitted in NICU of Kaohsiung Medical University Hospital were enrolled. They concluded that VAP was a problem for the LBW infants with intubation for >48 hours in NICU. The VAP had most frequently occurred at a postmenstrual age of 30-32 weeks.

A study on the successful implementation of a bundle strategy to prevent Ventilator Associated Pneumonia in a Neonatal Intensive Care Unit was conducted by Gokce (2017). Throughout the study period, 13 VAP episodes were

observed. The mean VAP rate decreased from 7.33/1000 to 2.71/1000 ventilator days following intervention ($p=0.083$).

A study on implementation of Ventilator bundle in Paediatric Intensive Care Unit of a developing country was conducted by Haque A et al (2017). In this study 1050 patients were enrolled and only 4 patients (0.7%) developed VAP. The strict implementation of simple inexpensive interventions (ventilator bundle) in the care of mechanically ventilated children can have reduced VAP even in resource-limited country. A study on applying adult Ventilator Associated Pneumonia Bundle evidence to the ventilated neonate was conducted by Weber CD (2009). There was an annual decrease in VAP rates .The rates were zero for 20 consecutive months from October 2012 to May 2014.

In the year 2016, Ferreira et al conducted a study on the effectiveness of a bundle in the prevention of VAP. The aim of this study was to evaluate the impact of a bundle called FAST HUG in ventilator-associated pneumonia, to weigh the healthcare costs of ventilator-associated pneumonia patients in the intensive care unit and hospital mortality due to ventilator-associated pneumonia. The implementation of FAST HUG, was followed by a noticeable decrease in the occurrence of ventilator-associated pneumonia ($p<0.01$), as well as a reduction in mortality rates ($p<0.01$). In addition, the intervention resulted in a significant reduction in intensive care unit hospital costs ($p<0.05$).

Morinec et al (2012) conducted a study on the risk factors and interventions for Ventilator – Associated Pneumonia in paediatric patients. This study aimed at identifying the risk factors associated with VAP among ventilated paediatric patients and to provide baseline data on current VAP prevention

practices in a PICU. The conclusion was that nursing and respiratory interventions are important in preventing VAP. It is believed that most of these interventions are routinely performed by nursing and respiratory staff when caring for ventilated paediatric patients.

In 2009, Implementation of a real time Compliance Dashboard to help reduce SICU Ventilator – Associated Pneumonia with the Ventilator Bundle was done by Zaydfudim et al through the dashboard application in a previous study. During the study, guidelines for the prevention of VAP improved from 39% in 2007 to 89% in 2008. In addition, the incidence of VAP reduced by 39 % from 15.2 to 9.3 cases per 1000 days using a ventilator in the Intensive Care Unit.

Summary

This chapter has provided a Review of Literature relevant to the problem stated. The literature presented was extracted from The Nursing Journal of India, Journal of Paediatric Nursing and other online journals. It includes 17 primary and 2 secondary sources. It has helped the researcher to understand the impact of problem under study.

CHAPTER-III

RESEARCH METHODOLOGY

Methodology of the research study is defined as the way the data are gathered in order to answer the questions to help analysis to the research problem. It enables the researcher to prepare a blue print for the research undertaken. The research methodology involves a systematic procedure by which the researcher starts from the initial identification of the problem and reaches its conclusion (Polit & Beck, 2012).

This chapter provides with a brief description of the different steps undertaken by the researcher for the study. It involves research approach, research design, setting, population, sample selection and sampling technique, sampling criteria, selection and development of the instruments, validity and reliability of the instruments, pilot study, data collection procedure and plan for data analysis. The present study was conducted to assess the nurse's compliance in using Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle for newborns.

Research Approach

Research approach is the most significant part of any research. The appropriate choice of the researcher approach depends on the purpose of the research study which is undertaken. According to Polit and Beck, (2012), a survey approach is designed to obtain information about the prevalence, distribution and interrelations of phenomena within a population . In this study survey approach was used.

Research Design

A research design incorporates the most important methodological design that researchers work on conducting a research study (Polit & Beck, 2012). The research design used in this study is descriptive correlational research design.

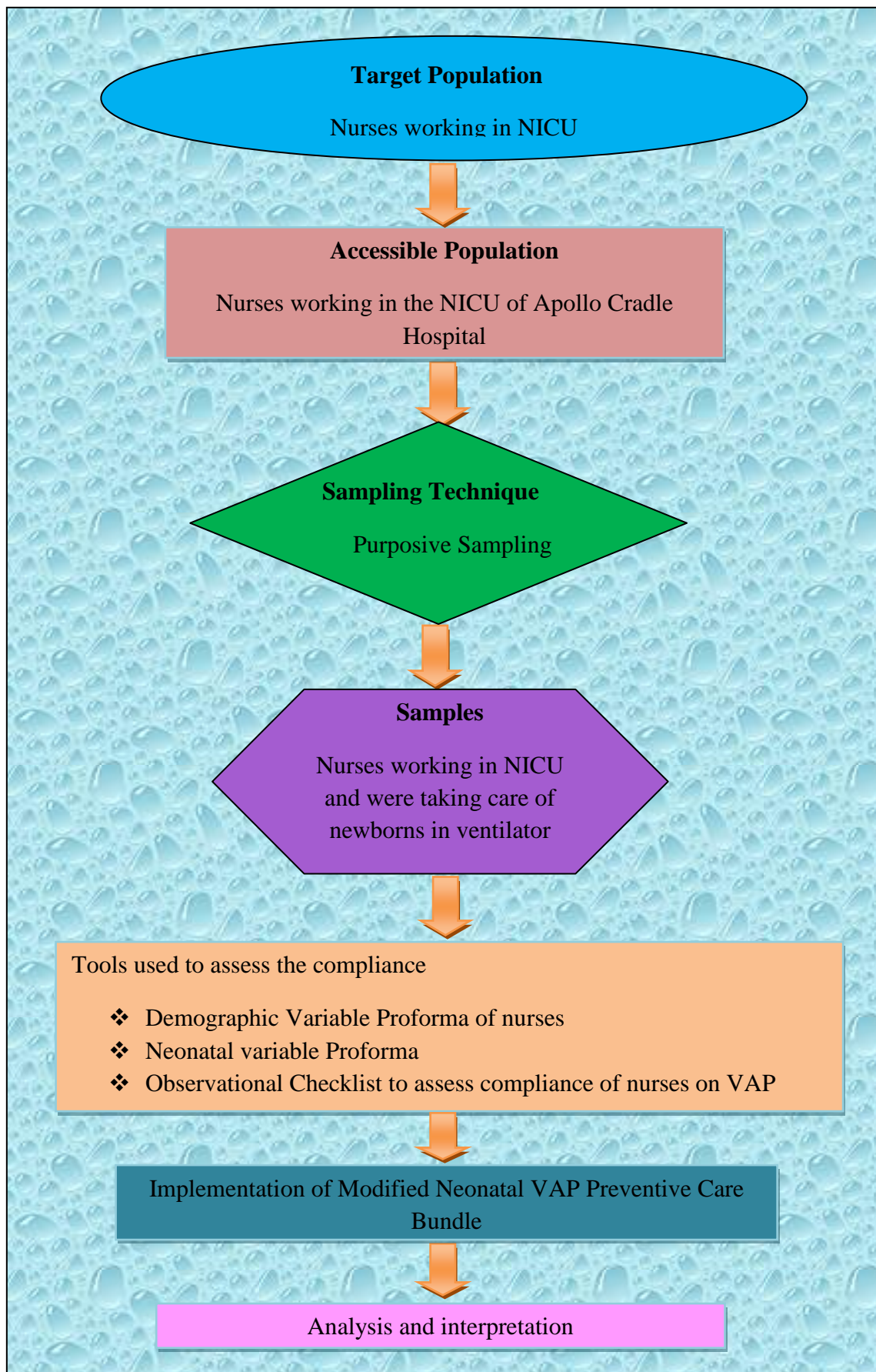


Fig.2.Schematic Representation of Research Design

Variables

Variables are attributes of variations that take place takes on different values (Polit & Beck, 2012).

Independent Variable

The variable that is believed to cause or influence the dependent variable is the independent variable (Polit & Beck, 2012). In this study the independent variable is Modified Neonatal VAP Preventive Care Bundle.

Dependent Variable

The variable hypothesized for dependence on or be caused by another variable is the dependant variable (Polit & Beck, 2012). In this study nurses' compliance was the dependent variable.

Attribute Variables

Variables that describe the study sample characteristics are termed as attribute variables (Polit and Beck, 2012).

Variables such as nurses' age, educational status, institution trained, years of experience, previous experience regarding VAP Bundle, attended any in service education on VAP Preventive care bundle.

Research Setting

Research setting is the location and the conditions in which data collection occurs in the study (Polit & Beck, 2012). The present study was conducted in Apollo Cradle Hospital for Women and Children. It is situated in Shafi Mohammed road, Chennai .It is a premier Institute for boutique birthing, fertility clinic, advanced gynecological and obstetrics, pediatrics and neonatology. Apollo

Cradle is a 50 bedded hospital pioneering concept in childbirth and maternity care in India. Apollo Cradle was conceived to satisfy the service and quality needs of a younger generation of Indians. Apollo cradle is a healthcare facility of International standards. They strive to deliver clinical excellence, personalized care and utmost comfort to the mother, the baby and the family. The average bed occupancy per month is 30 -40. They have a well equipped NICU with level I, II, III, here 1:1 nurse patient ratio is followed. Level I has 3 beds for ventilator assisted cases, newborns weighing less than 750 gm, less than 30 weeks old, newborns who require CPAP for more than 48 hours and newborns who require other intensive care treatments are admitted. In level II it has 5 beds, newborn weighing 750gm to 1500gm are admitted there CPAP facilities are available it is a transitional level to normalcy. In level III, which has bed strength of 4 provides supportive care. They have an isolation room with one bed for infectious cases. Other than this they have a nursery with 2 beds here normal newborns that require timely management is taken cared.

Population

Target Population

It is the aggregate of cases in which a researcher is interested and for which he would like to generalize the study results (Polit & Beck, 2012). In this study, the target population comprises of all nurses working in NICU's.

Accessible Population

It is the aggregate of cases that conforms to designated criteria and are accessible as subjects for a study (Polit & Beck, 2012). In this study, the

accessible population includes the nurses who are working in NICU caring for ventilated newborns in Apollo Cradle Hospital for Women and Children.

Sample

A sample is the subset of a population selected to participate in a study. Sample size for the present study is 30 nurses working in NICU of Apollo Cradle Hospital.

Sampling Technique

Sampling is a process of selecting a portion of the population to represent the entire population (Polit & Beck, 2012). The samples were selected by purposive sampling technique. All the available samples at the time of data collection, who met the inclusion criteria, were selected for the study.

Sampling Criteria

Inclusion Criteria

Nurses who were taking care of ventilated newborns in the NICU of Apollo Cradle Hospital.

Exclusion Criteria

Nurses who were not taking care of ventilated newborns in the NICU

Selection and Development of Tools

An instrument in research refers to the tool or equipment used for collecting data. (Polit and Beck, 2012)

The instruments such as

- Demographic Variable Proforma to assess the background characteristics of nurses working in NICU
- Neonatal clinical variable proforma
- Modified Neonatal VAP Preventive Care Bundle
- Practice checklist for nurses caring for neonates in ventilator were the tools used in the study.

Background Characteristics of Nurses

Proforma to assess the background characteristics of nurses working in NICU consists of age, educational status, Institution trained, years of experience, previous experience regarding VAP Bundle, attended any in service education on VAP Preventive care bundle.

Neonatal Clinical Variable Proforma

Neonatal clinical variable proforma contains 4 items- nature of birth, birth weight and baby condition at birth, APGAR score, Reason for ventilation, number of days in ventilator and the mode of ventilator.

Modified Neonatal VAP Preventive Care Bundle

Modified Neonatal VAP Preventive Care Bundle consists of core measures, equipment related measures and general measures. It consists of 18 items, in which 7 items are core measures, 7 items are equipment related measures and 4 items are general measures. Participants were asked to tick in the appropriate column in the checklist in every shift for 3 days.

Observational Checklist for Nurses

The observational checklist for nurses caring for neonates on ventilator contains 28 items, in which 14 items are Core measures, 7 items are Equipment related measures and 7 items are General measures. The researcher observed the nurses providing care for ventilated newborns and placed a tick mark against compliant scored as 2, partially compliant 1 and non compliant 0 depending on the nurses performance. The total obtainable score was 43 -56. The scores were interpreted as follows:

Score Interpretation

Scores	Percentage	Interpretation
43-56	76-100	Compliant
29-42	51-75	Partially compliant
0-28	Below 50	Non Compliant

Psychometric Properties of the Instrument

Validity

Content validity is the degree to which an instrument measures what it is supposed to measure. Content validity is the sampling adequacy of the content being measured. (Polit and Beck, 2012).

The content validity of the tool was obtained by getting opinion from experts in the field of Medicine and Nursing. The validity of the tools was obtained by getting opinions from 9 experts in the field of medicine, nursing and research. The experts had suggested some specific modifications in the background characteristics of nurses working in NICU, Neonatal clinical variable

proforma and Modified Neonatal VAP Preventive care bundle .The modifications and suggestions of experts was incorporated in the final preparation of the tool.

Reliability

Reliability is the degree of consistency with which an instrument measures the attribute it intended to measure (Polit & Beck, 2012). The reliability of the tools was determined by using inter rater technique. Karl Pearson's 'r' was computed for finding out the reliability. Modified Neonatal VAP Preventive Care Bundle – Inter rater technique ($r = 0.76$)

Pilot Study

Polit & Beck (2012) have stated that a pilot study is a miniature version of actual study in which the instruments are administered to the subjects drawn from the same population. The pilot study was conducted among 6 nurses who were taking care of ventilated newborns in Apollo Cradle Hospital. The pilot study revealed that the present study was feasible to conduct.

Protection of Human Rights

- Ethics clearance was obtained from Ethics Committee of Apollo Hospitals.
- Permission was obtained from the concerned authorities for the study from setting, the Principal and HOD of Child Health Nursing of Apollo College of Nursing.
- The procedure and study was explained and written consent was obtained from participants before data collection.
- Confidentiality was maintained throughout the study.

Data Collection Procedure

Data collection is the gathering of information needed to address a research problem. After obtaining formal permission from Principal of Apollo College of Nursing, Head of Child Health Nursing Department and the Ethics committee, Head of the selected hospital, written consent was obtained from 30 nurses working in NICU of Apollo Cradle Hospital.

Explanation and instructions were provided to nurses in the use of Modified Neonatal VAP Preventive Care Bundle to assess and prevent Ventilator Associated Pneumonia. The Modified Neonatal VAP Preventive care bundle checklist was given to them. They were observed by the researcher using the observational checklist when caring for the neonates in ventilator for three consecutive days in every shift and it was documented.

Problem Faced during Data Collection

The problem faced by the researcher during this study was that some nurses were not interested in participating in the study.

Plan for data analysis

Data analysis is the systematic organization and synthesis of research data and testing of research data and testing of research hypothesis by using the data obtained (Polit & Beck, 2012). Descriptive statistics like frequency percentage, mean, standard deviation and inferential statistics like chi- square test were used to analyse the data.

Summary

This chapter dealt with the selection of research approach, research design, setting, population, sample, sampling technique, sampling criteria, selection and development of study instruments, validity, reliability of the study, pilot study, data collection procedure, problem faced during data collection and plan for data analysis.

CHAPTER - IV

ANALYSIS AND INTERPRETATION

This chapter includes both descriptive and inferential statistics. Statistics is a field of study concerned with techniques or methods of collection of data, classification, summarizing, interpretation, drawing inferences, testing of hypothesis, making recommendation (Mahajan, 2004).

The data was collected from 30 nurses working in NICU in Apollo Cradle Hospital, Chennai to determine the effectiveness Compliance of Nurses in using the Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle. The data was analyzed with reference to the objectives and hypotheses of the study. Analysis of study was completed after all the data was transferred to the master coding sheet. The investigator used descriptive and inferential statistics for analysis.

Organization of Findings

The findings of the study were organized and have been presented under the following headings

- ✓ Frequency and Percentage Distribution of Background Characteristics of Nurses Working in NICU.
- ✓ Frequency and Percentage Distribution of Clinical Variables of Newborns in NICU
- ✓ Frequency and Percentage Distribution of Compliance of Nurses who were Using Modified Neonatal VAP Bundle for Newborns on Day 1, 2 and 3.
- ✓ Mean and Standard Deviation of Compliance of Nurses in implementing the Modified Neonatal VAP Bundle for Newborns on Day 1, 2 And 3.

- ✓ Association between the Selected Demographic Variables and Compliance of Nurses in implementing Modified Neonatal VAP Bundle for Newborns on Day 1
- ✓ Association between the Selected Demographic Variables and Compliance of Nurses in implementing Modified Neonatal VAP Bundle for Newborns on Day 2
- ✓ Association between the Selected Demographic Variables and Compliance of Nurses in implementing the Modified Neonatal VAP Bundle for Newborns on Day 3
- ✓ Incidence of Ventilator Associated Pneumonia (VAP) after Implementation of Ventilator Associated Pneumonia Preventive Care Bundle for Newborns.

Table 1: Frequency and Percentage Distribution of Demographic Characteristics of Nurses Working in NICU

(N=30)

S.No	Variables	f	%
1.	Age		
1.1	≤ 24 years	13	43.33
1.2	25 years & above	17	56.67
2.	Professional qualification		
2.1	Diploma in nursing	8	26.66
2.2	B. Sc (N)	22	73.33
2.3	M. Sc (N)	-	-
3	Total years of experience as staff nurse		
3.1	0-2 years	11	36.66
3.2	3 – 5years	11	36.66
3.3	6-8 years	8	26.66

Table 1 reveals that more than half of the nurses were aged 25 years and above (56.67%), qualified with B.Sc (N) (73.33%) with total experience as a staff nurse between 3 – 5years (36.66%) and majority of nurses had no previous experience on VAP bundle were (90%).

Fig 3 shows that most of the nurses had not attended any in-service education on Modified Neonatal VAP Preventive Care Bundle.

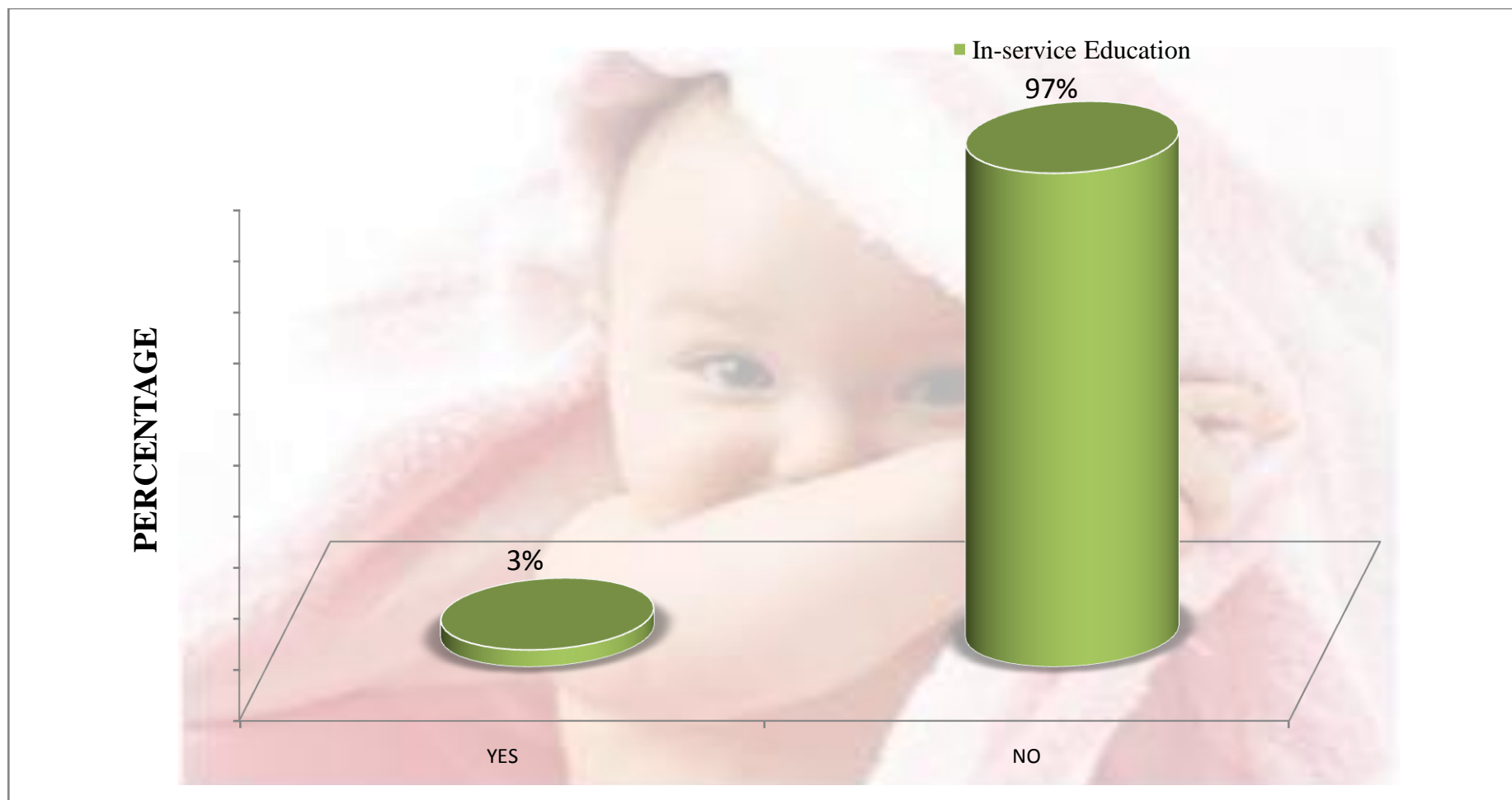


Fig 3. Percentage Distribution of Nurses who had Attended In-Service Education on VAP Bundle

Table 2: Frequency and Percentage Distribution of Clinical Variables of Newborns in NICU

(N= 10)

S.No	Variables	f	%
1	Nature of birth		
	Normal delivery	-	-
	Caesarean section	10	100
	Assisted delivery	-	-
2	Birth weight		
	<2.5 kg	10	100
	2.5-3 kg	-	-
	>3 kg	-	-
3	Baby Condition at birth		
	Cried	-	-
	Not cried	10	100
4	APGAR Score		
	<7	10	100
	>7	-	-
5	Mode of ventilation		
	SIMV Mode	9	90
	HFO Mode	1	10
6	Reason for ventilation		
	RDS	7	70
	Others	3	30
7	Number of days in ventilation		
	Upto 5 days	8	80
	Above 5 days	2	20

The data from table 2 reveals that all the child births were caesarean section (100%) with a birth weight of <2.5 kg (100%). All the newborns who didn't cry at birth were (100%) with an APGAR score <7 was (100%). Most of the newborns were ventilated for RDS (70%), were on ventilator for about 5days (80%), on SIMV mode (90%) respectively.

Fig 4 shows the percentage distribution of compliance of nurses in implementing Modified Neonatal VAP Bundle for Newborns in Day 1, 2 and 3. All the nurses had partial compliance (100%) on day 1 and day 2. On day 3 (16.66%) nurses were compliant and (80%) were partially compliant.

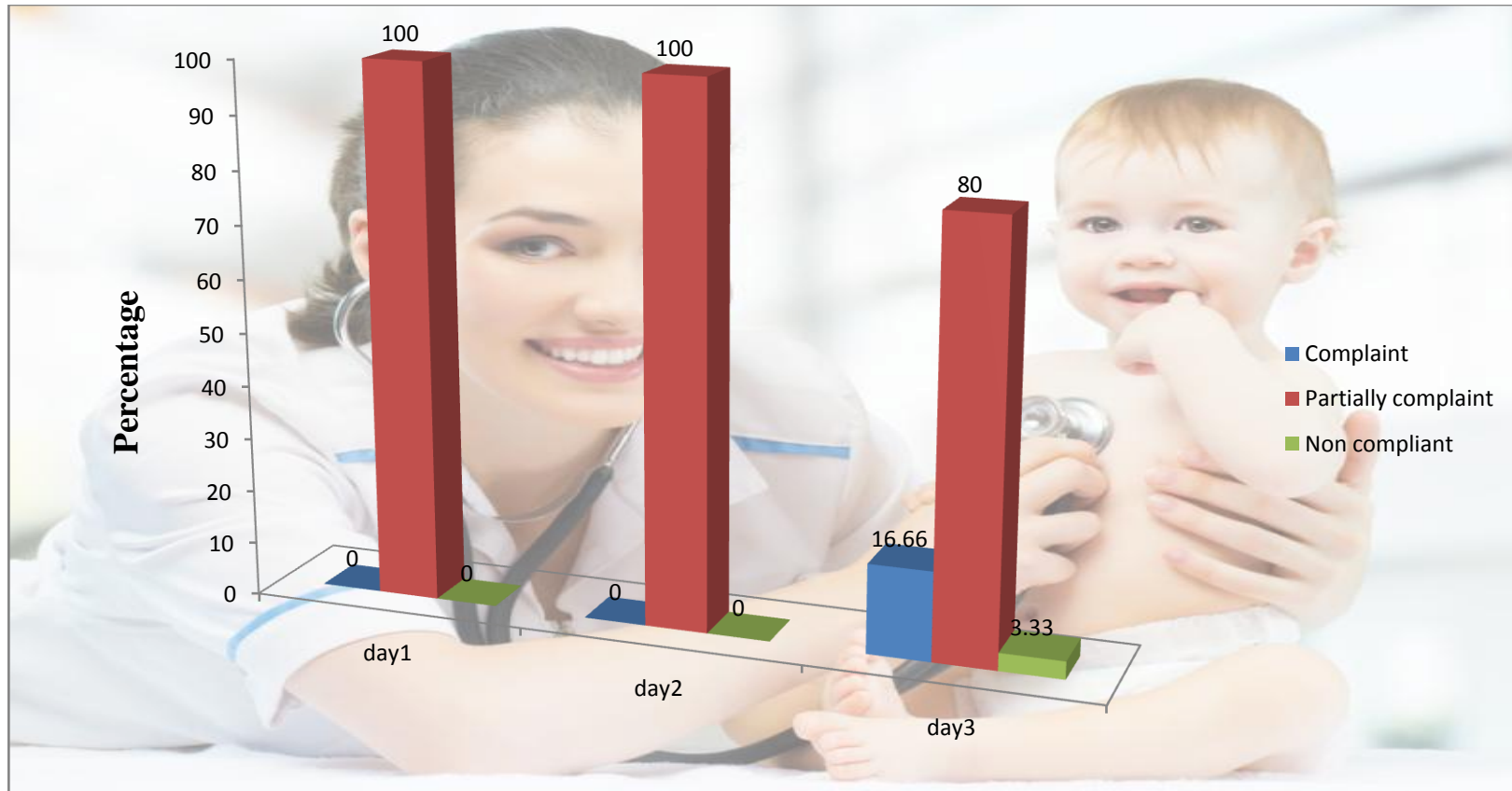


Fig.4: Percentage Distribution of Compliance of Nurses who implemented Modified Neonatal VAP Preventive Care

Bundle for Newborns on Day 1, 2 and 3

Table 3: Mean and Standard Deviation of the Global Score and Sub components of Modified Neonatal VAP Preventive Bundle on Day1, 2 and 3
(N=10)

Components	Maximum Score	DAY 1		DAY 2		DAY3	
		M	SD	M	SD	M	SD
Global Score							
(Maximum Score)	56	33.56	8.6	35.8	3.06	36.2	3.58
Core Measures	28	15.6	2.044	16.43	1.30	15.7	1.72
Equipment Related Measures	14	8.36	0.490	10.13	1.35	10.26	2.27
General Measures	14	9.53	1.30	9.2	1.12	10.66	2.00

Table 3 reveals the Global Mean Score and SD are 33.56(8.6) , 35.8(3.06), 36.2(3.58) on Day 1,Day 2 and Day 3 respectively. With regard to sub components, Mean and SD of core measures were 15.6(2.044), 16.43(1.30) and 15.7(1.72) on Day 1,Day 2 and Day 3 respectively. Mean and SD of equipment related measures were 8.36(0.490), 10.13(1.35) and 10.26(2.27) on Day 1,Day 2 and Day 3 respectively. Mean and SD of general measures were 9.53(1.30), 9.2(1.12) and 10.66(2.00) on Day 1,Day 2 and Day 3 respectively.

Table 4: Association between the Selected Demographic Variables and Compliance of Nurses who implemented the Modified Neonatal VAP Preventive Care Bundle for Newborns on Day 1

(N=30)

Variables	Non Compliant	Partially Compliant & Compliant	χ^2 df= 1
Age			
≤ 24 years	10	3	0.15
25 years & Above	12	5	NS
Professional qualification			
Diploma in nursing	5	3	0.65
B. Sc (N)	17	5	NS
Total years experience as staff nurse			
Below 5 years	17	5	0.65
Above 5 years	5	3	NS
Previous experience on VAP bundle			
Yes	2	1	0.07
No	20	7	NS
Attended in-service education regarding VAP bundle			
Yes	1	0	0.37
No	21	8	NS

NS- Not Significant

Table 4 shows that there is no association between the compliance of nurses in using Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive care bundle and selected demographic variables ($p>0.05$) on day 1

Table 5: Association between Selected Demographic Variables and Compliance of Nurses who implemented the Modified Neonatal VAP Preventive Care Bundle for Newborn Day 2

(N=30)

Variables	Non Compliant	Partially Compliant & Compliant	χ^2 df=1
Age			
≤24 years	4	9	0.34
25 years & Above	7	10	
Professional qualification			
Diploma in nursing	2	6	0.63
B. Sc (N)	9	13	
Total years experience as staff nurse			
Below 5 years	9	13	0.63
Above 5 years	2	6	
Previous experience on VAP bundle			
Yes	3	0	5.75*
No	8	19	
Attended in service education regarding VAP bundle			
Yes	1	0	2.06
No	9	20	

****p<0.01**

The above table reveals that there is no association between the nurses' compliance and selected variables ($p>0.05$) except previous experience on VAP Bundle ($p<0.01$)

There was a significant association between the previous experience (5.75, $df=1$) and the compliance of nurses who are using Modified Neonatal VAP Preventive Care Bundle for newborn at ($p < 0.05$) level. However there was no significant association between other background characteristics like age, professional qualification, total years of experience as staff nurse and exposure to In-service education regarding VAP Preventive Care Bundle ($p>0.05$). Hence the hypothesis there will be no significant association between compliance of nurses on using Ventilator Associated Pneumonia (VAP) preventive care bundle and selected background variables of the nurses was accepted, except with regard to previous experience of using VAP Preventive Care Bundle.

Table 6: Association between the Selected Demographic Variables and Compliance of Nurses in Using Modified Neonatal VAP Preventive Care Bundle for Newborns in Day 3

(N=30)

Variables	Non Compliant	Partially Compliant & Compliant	χ^2 df=1
Age			
≤24 years	7	6	2.91
25 years & Above	4	13	
Professional qualification			
Diploma in nursing	3	5	0.003
B. Sc (N)	8	14	
Total years experience as staff nurse			
Upto 5 years	8	14	0.003
Above 5 years	3	5	

Table 6 describes the association between the compliance of nurses with the demographic variable of nurses. There is no association between selected demographic variables and compliance of nurses in using Modified Neonatal VAP Bundle for Newborns.

Table 7: Incidence of Ventilator Associated Pneumonia (VAP) after implementation of Ventilator Associated Pneumonia Preventive Care Bundle for Newborns.

(N = 10)

Incidence	f	%
Incidence of VAP	0	0

The above table depicts that there is no incidence of Ventilator Associated Pneumonia (VAP) after implementation of Ventilator Associated Pneumonia (VAP) Preventive Care Bundle for newborns.

Summary

This chapter dealt with the objectives of the study, major findings of the demographic variables of Nurses who are using Modified Neonatal VAP Bundle for newborns. Comparison of Mean and Standard Deviation of compliance of nurses who are using Modified Neonatal VAP Bundle for newborns in day1, 2 and 3. Association between the Selected Background Characteristics and Compliance of nurses in using Modified Neonatal VAP Bundle for newborns in day 1, 2 and 3.

CHAPTER V

DISCUSSION

“A Study to Assess the Nurses’ Compliance in using Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle for Newborns at Selected Hospitals, Chennai”.

Objectives of the Study

1. To assess the Compliance of nurses in using Modified Neonatal Ventilator Associated Pneumonia (VAP) preventive care bundle for newborns.
2. To find out the association between the compliance of nurses in using Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle and selected demographic variables of the nurses.
3. To determine the incidence of Ventilator Associated Pneumonia after Implementing the use of Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle.

The discussion is presented under the following headings

- ✓ Distribution of background characteristics
- ✓ Distribution of clinical variables seen in newborns
- ✓ Compliance of nurses in NICU using Modified Neonatal VAP Bundle
- ✓ Association between the compliance of nurses with use of Modified Neonatal VAP Bundle and selected background variables of nurses

Distribution of Background characteristics

With regard to background characteristics of nurses, more than half of the nurses were aged 25 years and above 17(56.67%), qualified with B.Sc (N) 22 (73.33%) with total experience as a staff nurse between 3 – 5years 11(36.66%) respectively. Majority of nurses had no previous experience on VAP bundle were 27 (90%) or had attended any in-service education on VAP Preventive Care Bundle 27(90%).

We can infer from the above findings that many of the nurses did not have any having previous experience and In-service education regarding the use of Modified Neonatal VAP Bundle for newborn, so training them will promote using the Modified Neonatal VAP Bundle for newborn as well as they will be able to provide quality care.

Distribution of clinical variables seen in newborns

All the child births were Caesarean section (100%) with a birth weight of <2.5 kg (100%). All newborns didn't cry at birth (100%), they had APGAR score of <7 (100%). Most of the newborns were ventilated for RDS 7(70%), were on ventilator for about 5days (80%), in SIMV mode (90%) respectively.

The study findings depicts that most of the newborns that were born below 2.5 kg through Caesarean section were ventilated. So the nurses need to be trained for using the Modified Neonatal VAP Bundle for newborn to provide a quality care.

The first objective of the study is to assess the nurses' compliance in using Modified Neonatal ventilated associated pneumonia (VAP) preventive care bundle for newborns.

The present study reveals that all the nurses had partial compliance (100%) on day 1 and day 2. On day 3, (16.66%) nurses were complaint and (80%) were partially complaint. The mean and standard deviation of compliance of nurses was found to be higher on the third day of implementation of VAP bundle (M- 36.2 & SD-3.58) in comparison with day 1 (M 33.56 & SD-31.99) on day 1 and day 2 (M 35.8 and SD- 3.06).

Edwin (2016) conducted a study on the effect of nursing practice standards on knowledge and practice of nurses regarding selected nursing care activities and the outcome of children on ventilators in Paediatric Intensive Care Unit of CMC, Vellore. The study showed that Nursing Practice Standards (NPS) education programme was effective in terms of increasing the knowledge and practice of nurses, improving outcome of children on ventilators and in increasing satisfaction of parents.

The second objective was to find the association between compliance of nurses in using Modified Neonatal ventilator associated pneumonia (VAP) Preventive Care Bundle and selected demographic variables of the nurses

Chi square test was used to find out the association between selected background characteristics and the compliance of nurses in using Modified Neonatal VAP Bundle for newborn on day 1, 2 and 3, it was inferred that there was no significant association between selected background characteristics and

compliance of nurses in using Modified Neonatal VAP Bundle for newborn in day 1, 2 and 3 at ($p > 0.05$).

There was a significant association between the previous experience ($\chi^2 = 5.75$, $df = 1$) and the compliance of nurses who are using Modified Neonatal VAP Preventive Care Bundle for newborn at ($p < 0.05$) level. However there was no significant association between other demographic characteristics like age, professional qualification, total years of experience as staff nurse and exposure to In-service education regarding VAP Bundle ($p > 0.05$). Hence the hypothesis there will be no significant association between compliance of nurses on using Ventilator Associated Pneumonia (VAP) Preventive Care Bundle and selected background variables of the nurses was retained.

The third objective was to determine the incidence of Ventilator Associated Pneumonia after implementing the use of Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle.

A similar study on the successful implementation of a bundle strategy to prevent Ventilator Associated Pneumonia in a Neonatal Intensive Care Unit was conducted by Gokce (2017). Throughout the study period, 13 VAP episodes were observed. The mean VAP rate decreased from 7.33/1000 to 2.71/1000 ventilator days following intervention ($p = 0.083$).

The finding of the present study reveals that there was no incidence of Ventilator Associated Pneumonia (VAP) after implementation of Ventilator Associated Pneumonia (VAP) Preventive Care Bundle for newborns. Thus we can conclude that the VAP Preventive Care Bundle is an effective tool to prevent the incidence of Ventilator Associated Pneumonia in newborns.

Summary

This chapter dealt with the objectives of the study, major findings of the demographic variables of Nurses who are using Modified Neonatal VAP Bundle for newborns, comparison of Mean and Standard Deviation of compliance of nurses who are using Modified Neonatal VAP Bundle for newborns in day1, 2 and 3, association between the Selected Background Characteristics and compliance of nurses with the use of the Modified Neonatal VAP Bundle on day 1, 2 and 3.

CHAPTER VI

SUMMARY, CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS

This is the most creative and demanding part of the study. This chapter gives a brief account of the present study and provides conclusions drawn from the findings, recommendations, limitations of the study, suggestions for the study and nursing implications.

Summary

The aim of the study is to assess the compliance of nurses with the use of Modified Neonatal VAP Bundle for newborns.

Objectives of the Study were

1. To assess the compliance of nurses in using Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle for newborns.
2. To find out the association between the compliance of nurses in using Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle and selected demographic variables of the nurses.
3. To determine the incidence of Ventilator Associated Pneumonia after implementing the use of Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle.

Major Findings of the Study were

More than half of the nurses were aged 25 years and above (56.67%), qualified with B.Sc (N) (73.33%) with total experience as a staff nurse between 3 – 5years (36.66%) respectively. Majority of nurses had no previous experience on VAP bundle were (90%).

All the child births were Caesarean section (100%) with a birth weight of <2.5 kg (100%). All newborns didn't cry at birth (100%), they had APGAR score of <7 (100%). Most of the newborns were ventilated for RDS 7(70%), were on ventilator for about 5days (80%), in SIMV mode (90%) respectively.

All the nurses had partial compliance (100%) on day 1 and day 2. On day 3, (16.66%) nurses were complaint and (80%) were partially complaint. The mean and standard deviation of compliance of nurses was found to be higher on the third day of implementation of VAP bundle (M- 36.2 & SD-3.58) in comparison with day 1 (M 33.56 & SD-8.6) on day 1 and day 2 (M 35.8 SD- 3.06).

Chi square test was used to find out the association between selected background characteristics and the compliance of nurses in using Modified Neonatal VAP Bundle for newborn on day 1, 2 and 3, it was inferred that there was no significant association between selected background characteristics and compliance of nurses in using Modified Neonatal VAP Bundle for newborn in day 1, 2 and 3 at ($p > 0.05$).

There was a significant association between the previous experience (5.75, $df=1$) and the compliance of nurses who are using Modified Neonatal VAP Bundle for newborn at ($p < 0.05$) level. However there was no significant

association between other background characteristics like age, professional qualification, total years of experience as staff nurse and exposure to In-service education regarding VAP Bundle ($p>0.05$). Hence the hypothesis there will be no significant association between compliance of nurses on using Ventilator Associated Pneumonia (VAP) preventive care bundle and selected background variables of the nurses was retained.

The findings revealed that there was no incidence of Ventilator Associated Pneumonia (VAP) after implementation of Ventilator Associated Pneumonia (VAP) Preventive Care Bundle for newborns. Thus we can conclude that the VAP Preventive Care Bundle is an effective tool to prevent the incidence of Ventilator Associated Pneumonia in newborns.

Conclusion

The findings of the study revealed the compliance of nurses in with the use of Modified Neonatal VAP Preventive Care Bundle for newborn improved on day 3. Thus the incidence of Ventilator Associated Pneumonia in newborn was anticipated and appropriate preventive measures were taken.

Nursing Implications

Based on the findings, the researcher recommends the following implications in the field of nursing practice, nursing administration, nursing education, nursing research.

Nursing Practice

The findings from literature review show a large number of Ventilator Associated Pneumonia in newborns of NICU. This could be reduced through the

use of good nursing care from the nurses in NICU. Thus it is important to follow the protocols for the care of the ventilated babies. With the above mentioned strategies Modified Neonatal VAP Preventive Care Bundle is an effective tool for identifying the risk for fall in newborns and for taking appropriate preventive measures.

Nursing Education

With the emerging health care demands and newer trends in the field of nursing education, the focus should be on the innovations that would enhance the nursing care. The nursing students should be taught the appropriate protocol. Therefore student nurses should be taught the effective nursing care needed for the Ventilated Newborns for preventing VAP. Demonstration of appropriate techniques and preventive measures in the clinical setup helps the students to acquire adequate knowledge relating to Modified Neonatal Ventilated Associated Pneumonia preventive Care Bundle and incorporate it in their practice.

Nursing Administration

With technological advances and ever growing challenges seen in health care, administrators have the responsibility to provide continuing nursing education opportunities to ensure awareness regarding Modified Neonatal VAP Preventive Care Bundle. This would enable the nurses to update knowledge and render cost effective care to the newborns. The nurse administrators can train the nurses in the implementation of the Modified Neonatal VAP Preventive Care Bundle for the Newborns. Nurse administrators must periodically organize formal training programme to the nurses for the demonstration and practice of preventive measures.

Nursing Research

Professionals and the students can go in for further studies related to the effectiveness of Modified Neonatal VAP Preventive Care Bundle for newborns. There is a need for extensive research in this area. Nurse researchers should appraise challenges and should perform scientific work by taking part in assessment, applications, evaluation for newborns. The researcher can help bringing in the researched technique into practice. Researchers must focus on developing appropriate protocols for reducing the incidence of the Ventilator Associated Pneumonia in newborn.

Recommendations

- A similar study could be undertaken on a larger scale for a better valid generalization.
- The present study could be replicated in different settings.
- A comparative study can be done using different VAP Bundle practice checklists.

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APPENDIX -1

LETTER PERMITTING TO CONDUCT THE STUDY



(Recognised by the Indian Nursing Council and Affiliated to the Tamil Nadu Dr. M.G.R. Medical University, Chennai)

CO/0208/16

17.11.2016

To,

Dr. Rachana Mishra
Medical Superintendent
Apollo Cradle hospital
8, Shafee Mohammed Road
Thousand lights west
Chennai – 06

Respected Madam,


Sub: to request permission for research study –Reg

Greetings! As part of the curriculum requirement our 2nd year M.Sc (N) student Ms. Neema John has selected the following title for her research study.

"A Study to Assess the Nurse's Compliance in Using Revised Ventilator Associated Pneumonia (VAP) Preventive Care Bundle for Newborns at Selected Hospitals, Chennai."

So I kindly request your goodselves to permit her to conduct study in your esteemed hospital.

Thanking you,


Dr. LATHA VENKATESAN
PRINCIPAL

Permitted
Dr. Rachana Mishra
22/11/16

Regd. Office : 21, Greaves Lane Off, Greaves Road, Chennai - 600 006, Ph. : +91-44-2829 3333, 2829 0200 Website : www.apollohospitalseducation.com
Unit Office : Venugaram to Ambattur Main Road, Ayambakkam, Chennai - 600 095. Phone : 044 - 2653 4387 Fax : 044 - 2653 4923 / 2653 4386



Emergency Service
Dial **1066**



APPENDIX -II

ETHICS COMMITTEE CLEARANCE LETTER

Institutional Ethics Committee - Clinical Studies

Reg.No.: ECR/37/Inst/TN/2013



25 Nov 2016

To,
Ms. Neema John,
Second year, M.Sc. (Nursing),
Department of Child Health Nursing,
Apollo College of Nursing, Chennai.

Ref: A study to assess the Nurse's Compliance in using Revised Ventilator associated Pneumonia (VAP) Preventive Care Bundle for Newborns at selected hospitals, Chennai

Sub: Approval of the above referenced project and its related documents.

Dear Ms. Neema John,

The Institutional Ethics Committee-Clinical Studies has received the following document submitted by you related to the conduct of the above-referenced study -

- Project Proposal

The Institutional Ethics Committee-Clinical Studies reviewed and discussed the project proposal documents submitted by you at a meeting held on 22 November 2016.

The following Institutional Ethics Committee – Clinical Studies members were present at the meeting held on 22nd Nov 2016 at 3.30 PM at, Apollo Research & Innovations, Conference Hall, Room No: 19, 2nd Floor, Krishnadeep Chambers, (Apollo Hospitals, Annex No: 1), Wallace Garden, Chennai – 600006

S. No	Name	Gender	Designation	Affiliation	Position in the committee
1	Dr. Rema Menon	F	Blood Bank Transfusion Services	Apollo Hospitals, Chennai	Member Secretary
2	Dr. Pradeep Kumar	M	Pharmacologist	Apollo Hospitals, Chennai	Pharmacologist
3	Ms. Maimoona Badsha	F	Lawyer	Independent legal Practitioner, Chennai	Lawyer
4	Mrs. Malathy Chandrasekhar	F	Home based teacher	Freelance	Layperson
5	Dr. K. Sathyamurthi	M	Asst. Professor	Madras School of Social work, Chennai	Social Scientist

Apollo Hospitals Enterprise Limited,

21, Greaves Lane, Off Greaves Road, Chennai - 600 006, Tamil Nadu, India. Tel : +91-44-2829 5045 / 6641 Fax : +91-44-2829 4449

E-mail : ecapollochennai@gmail.com

Institutional Ethics Committee - Clinical Studies

Reg.No.: ECR/37/Inst/TN/2013

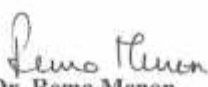


The Institutional Ethics Committee-Clinical Studies reviewed the proposal, its methodology and design of the study. The proposed thesis work is approved in the presented form without any modifications.

The Institutional Ethics Committee-Clinical Studies review and approval of the report is only to meet their academic requirement and will not amount to any approval of the conclusion / recommendations as conclusive, deserving adoption and implementations, in any form, in any health care institution.

The Institutional Ethics Committee-Clinical Studies is constituted and works as per ICH-GCP, ICMR and revised Schedule Y guidelines.

Regards,


Dr. Rema Menon,
Member Secretary,
Institutional Ethics Committee-Clinical Studies,
Apollo Hospitals,
Chennai.

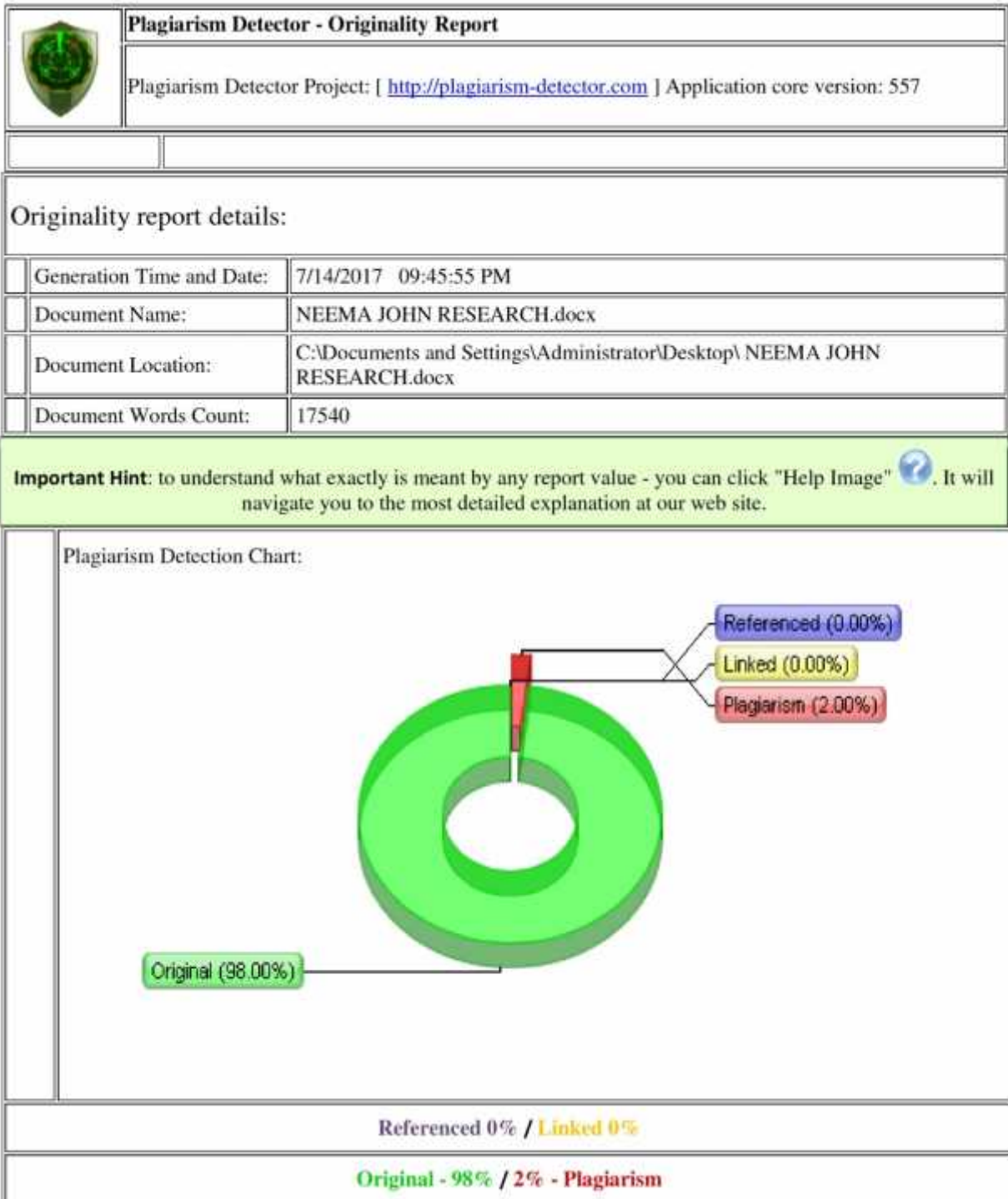
Date: 25/11/2016

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE CLINICAL STUDIES
APOLLO HOSPITALS, AHCL
CHENNAI, TAMILNADU.

Apollo Hospitals Enterprise Limited,

21, Greams Lane, Off Greams Road, Chennai - 600 006, Tamil Nadu, India. Tel : +91-44-2829 5045 / 6641 Fax : +91-44-2829 4449

E-mail : ecapollochennai@gmail.com



APPENDIX –IV

REQUEST FOR CONTENT VALIDITY

LETTER REQUESTING OPINIONS AND SUGGESTIONS OF EXPERTS FOR ESTABLISHING CONTENT VALIDITY OF RESEARCH

From

Ms. Neema John
M.Sc., (Nursing) II Year,
Apollo College of Nursing,
Chennai-95.

To

Through Proper channel
Dr. Latha Venkatesan,
Principal,
Apollo College of Nursing.

**Sub: Request for opinions and suggestions of experts for content validity of
Research tool-Reg**

Respected Sir/ Madam

Greetings! As a part of the Curriculum Requirement the following research title is selected for the study.

“A Study to Assess the Nurse’s Compliance in Using Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle for Newborns in Selected Hospitals, Chennai”.

I will be highly privileged to have your valuable suggestions with regard to content validity of research tool. So, I request you to validate my tool and give your valuable suggestions about the tool.

Thanking You,

Yours Sincerely,

(Ms.Neema John)

APPENDIX - V

LIST OF EXPERTS FOR CONTENT VALIDITY

1. Dr.Latha Venkatesan, M.Sc(N),M Phil., Ph.D(N) (HDRFS), M.BA(HM),

Principal and professor

Apollo College of Nursing

Chennai-95

2.Dr.Latha Kanchi Parthasarathy; MBBS; DCH,MRCPCH:CCT(London)

Neonatologist

Apollo Childrens Hospital

Chennai-95

3. Ms. Asha Latha

Nursing Officer

Apollo Cradle Hospital

Chennai-95

4. Dr. Lizy Sonia A., M.Sc(N), Ph.D(N),

Vice-principal

Apollo College of Nursing

Chennai -95.

5. Dr. K. Vijayalakshmi, M.Sc(N),M.A. (Psy), MBA.,Ph.D(N)

HOD of Mental Health Nursing ,

Apollo College of Nursing

Chennai -95.

6. Prof. Nesa Sathya Satchi, M.Sc (N).,

HOD of Child Health Nursing

Apollo College of Nursing

Chennai – 95.

7. Mrs. Jamuna Rani, M.Sc (N).,

Reader,

Department of Child Health Nursing

Apollo College of Nursing

Chennai – 95.

8. Mrs. Jennifer .G., M.Sc (N).,

Lecturer,

Department of Child Health Nursing

Apollo College of Nursing

Chennai – 95.

9. Mrs. V. Dhanalakshmi, M. Sc., (N).,

Reader,

Department of Obstetrics and Gynecological Nursing

Apollo College of Nursing, Chennai.

APPENDIX – VI
CONTENT VALIDITY CERTIFICATE

I hereby certify that I have validated the research tool and interventional programme of Ms. Neema John, M.Sc (Nursing) II year student who is undertaking research study on **“A Study to Assess the Nurse’s Compliance in Using Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle for Newborns in Selected Hospitals, Chennai”**.

Signature of Expert

Name and designation

APPENDIX VII
RESEARCH PARTICIPANT CONSENT FORM

Dear participant,

I am Neema John, M.Sc(N) student of Apollo College of Nursing, Chennai. As part of my study, a research on **“A Study to Assess the Nurses Compliance in Using Modified Neonatal Ventilator Associated Pneumonia (VAP) Preventive Care Bundle for Newborns in Selected Hospitals Chennai.”** Is selected to be conducted. The findings of the study will be helpful to prevent fall in newborns.

I hereby seek your consent and cooperation to participate in the study. Please be frank and honest in your responses. The information collected will be kept confidential and anonymity will be obtained.

Signature of investigator

I Ms. ----- hereby consent to participate in this study.

Place:

Date

Signature of the participant

APPENDIX - VIII

CERTIFICATE FOR ENGLISH EDITING TO WHOMSOEVER IT MAY CONCERN

This is to certify that the dissertation "A Study to Assess the Nurses' Compliance in using Revised Ventilator Associated Pneumonia (VAP) Preventive Care Bundle for Newborns at Selected Hospitals, Chennai." by Ms. Neema John M.Sc. (Nursing) student Apollo College of Nursing was edited for English language appropriateness.

Prof. J.L. NARASIMHAN
New No.8, Second Main Road,
Block B - F1, Krishna Nagar,
Chromepet, Chennai-600 044.
Call : 94446 54720
e-mail : profjln@yahoo.com



Signature of Expert

APPENDIX IX

DEMOGRAPHIC VARIABLE PROFORMA TO ASSESS THE BACKGROUND CHARACTERISTICS OF NURSES WORKING IN NICU

Purpose

This proforma is used by the researcher to collect information on demographic variable of nurses such as age in years, educational status and years of experience.

Instruction

Please put a tick mark () in the following options. Please be frank in answering.

The information collected will be confidential.

Sample no-

1. Age in years

2. Educational status

2.1 Diploma in nursing

☐

2.2 B.Sc nursing

☐

2.3 M.Sc nursing

☐

3. Years of experience

3.1 0-2

☐

3.2 3-5

☐

3.3 6-8

☐

4. Previous experience regarding VAP Bundle

4.1 Yes

☐

4.2 No

☐

5. Attended any in-service education on VAP Bundle?

5.1 Yes

☐

5.2 No

☐

APPENDIX - X

NEONATAL CLINICAL VARIABLE PROFORMA

Purpose

The proforma is used to measure the clinical variable such as nature of birth, baby condition at birth, APGAR score at 1 minute, birth weight.

Instruction

The researcher will check the records and fill the details

1. Nature of birth

1.1 Normal vaginal delivery

1.2 Caesarean section

1.3 Assisted vaginal delivery

2. Birth Weight

2.1 <2.5kg

2.2 2.5-3.0 kg

2.3 >3.0 kg

3. Baby condition at birth

3.1 Cried

3.2 Not cried

4. APGAR score

4.1 <7

4.2 >7

5.Reason for ventilation

5.1 Respiratory Distress Syndrome(RDS)

5.2 Others

6.Number of days in ventilation

6.1 Upto 5 days

6.2 Above 5 days

7.Mode of ventilation

7.1 SIMV Mode

7.2 HFO Mode

APPENDIX - XI

PRACTICE CHECKLIST FOR NURSES WHO ARE USING THE VENTILATOR ASSOCIATED PNEUMONIA PREVENTIVE CARE BUNDLE

Purpose

This checklist is used to observe the practice of staff nurses who are using the ventilator associated pneumonia preventive care bundle.

Instructions

The investigator completes this checklist by direct observation of nursing care and from nurse's documentation.

Abbreviations used are

P- Performed

NP-Not performed

MEASURES	S. NO	COMPONENTS	1 st SHIFT		2 nd SHIFT		3 rd SHIFT	
			Yes	No	Yes	No	Yes	No
CORE MEASURES	1.	Head end elevation 15 ⁰ to 30 ° (tilt the mattress and place a shoulder pad under the shoulders)						
	2.	Check for bilateral air entry and chest movements						
	3.	Give chest physio and reposition baby every two hours, unless contraindicated. Drain ventilator circuit before repositioning						
	4.	Suction endotracheal tube only when indicated by a clinical examination; do not instill physiological saline for suctioning (unless indicated)						
	5.	Use a closed suction system – the						

		canister and tubing must be separate for oral and ETT suctioning						
	6.	Oral care with sterile water/ saline every 2 hours, moisten lips with petroleum jelly/ sterile water						
	7.	Sedation vacation as per the protocol(Refer annexure-I)						
EQUIPMENT RELATED MEASURES	1.	Monitor ventilator settings every hourly (Fio ₂ , Rate, PIP,PEEP)						
	2.	Manage ventilator alarms as per protocol (Annexure II)						
	3.	Check for DOPE (D-displacement of the tube,O-obstruction/tube blocked, pneumothorax, E-equipment failure)						
	4.	Change ventilator circuit only when circuit is visibly soiled or malfunctioning						
	5.	Drain condensation from ventilator circuit every 2-4 hours						
	6.	Store oral suction devices in non sealed plastic bag at the bedside when not in use						
	7.	Rinse suction devices after use with normal saline						
GENERAL MEASURES	1.	Perform hand hygiene before and after contact with neonate /ventilator circuit						
	2.	Wear a gown, mask and eye protection before providing care to neonate, when soiling from respiratory secretions is expected.						
	3.	Use sterile gloves when performing intubation, opening ventilator circuit, handling respiratory secretions and suctioning						
	4.	Document HOB elevation, oral care provided, suctioning and ventilator changes as indicated.						

APPENDIX - XII

OBSERVATIONAL CHECKLIST FOR NURSES CARING FOR NEWBORNS IN VENTILATOR

Purpose

The researcher completes this checklist by direct observation of nursing care and from nurse's documentation in neonate's record.

Name of the patient:

Age:

Address:

IP No:

Consultant:

Date of admission:

Expected length of stay:

Date of discharge:

	Date :	Shift 1			Shift 2			Shift 3		
S.NO	MEASURES	N 0	PC 1	C 2	N 0	PC 1	C 2	N 0	PC 1	C 2
1.	CORE MEASURES									
1.1	Tilt the mattress									
1.2	Place a shoulder pad under the shoulders									
1.3	Head end elevation 15 to 30 degree									
1.4	Check for bilateral air entry									
1.5	Check for chest movements									
1.6	Give chest physiotherapy									
1.7	Drain ventilator circuit									
1.8	Reposition baby every two hours									
1.9	Use separate tubing for oral suctioning									
2.0	Use separate tubing for ETT suctioning									
2.1	Oral care with sterile water or saline									

2.2	Time interval 2 hours									
2.3	Moisten lips with petroleum jelly/sterile water									
2.4	Sedation vacation									
3	EQUIPMENT RELATED MEASURES									
3.1	Every hourly monitor Ventilatory settings									
3.2	Manage ventilator alarms									
3.3	Check for									
3.3.1	Displacement of the tube									
3.3.2	Obstruction/tube blocked									
3.3.3	Pneumonia									
3.3.4	Equipment failure									
3.4	When circuit is visibly soiled change ventilator circuit									
3.5	Drain condensation from ventilator circuit									
3.6	Store oral suction devices in non sealed plastic bag when not in use									
3.7	After use rinse suction devices with Normal saline									
4	GENERAL MEASURES									
4.1	Maintaining hand hygiene									
4.2	Wear a gown, mask & eye protection									
4.3	Use sterile gloves									
4.4	Head end elevation 15 to 30 degree									
4.5	Oral Care									
4.6	Suctioning									
4.7	Ventilatory settings									

SCORING KEY AND INTERPRETATION

SCORE	PERCENTAGE	INTERPRETATION
43-56	76-100%	Compliant
29-42	51-75%	Partially compliant
0-28	Below 50%	Non Compliant

APPENDIX - XIII

BLUE PRINT ON OBSERVATIONAL CHECK LIST TO ASSESS THE COMPLIANCE OF NURSES IN USING REVISED VAP BUNDLE

S.No	Components	Items	Total Items	Percentage
1	Core Measures	1.1,1.2,1.3,1.4,1.5 1.6,1.7,1.8,1.9,2.0 2.1,2.2,2.3,2.4	14	45.16%
2	Equipment Related Measures	3.1,3.2,3.3.1,3.3.2, 3.3.3,3.3.4,3.4,3.5,3.6,3.7	10	32.25%
3	General Measures	4.1,4.2,4.3,4.4, 4.5,4.6,4.7	7	22.59%
Total		-	31	100%

APPENDIX - XIV
DATA CODE SHEET
DEMOGRAPHIC VARIABLE PROFORMA

1.AG- Age in years

2.ED- Educational Status

2.1 Diploma in nursing

2.2 B.Sc nursing

2.3 M.Sc nursing

3.YE- Years of experience

3.1 0-2

3.2 3-5

3.3 6-8

4.PE- Previous experience

4.1 Yes

4.2 No

5. AI- Attended in service education

5.1 Yes

5.2 No

NEONATAL CLINICAL VARIABLE PROFORMA

1.NB- Nature of birth

1.11. Nature of birth

1.2 Normal vaginal delivery

1.2 Caesarean section

1.3 Assisted vaginal delivery

2. BW- Birth Weight

2.1 <2.5kg

2.2 2.5-3.0 kg

2.3 >3.0 kg

3.BCB- Baby condition at birth

3.1 Cried

3.2 Not cried

4. AS- APGAR score

4.1 <7

4.2 >7

5.RV- Reason for ventilation

5.1 Respiratory Distress Syndrome(RDS)

5.2 Others

6.NV-Number of days in ventilation

6.1 Upto 5 days

6.2 Above 5 days

7.MV-Mode of ventilation

7.1 SIMV Mode

7.2 HFO Mode

APPENDIX - XV

MASTER CODE SHEET

DEMOGRAPHIC VARIABLE					CLINICAL VARIABLE								DAYS		
S.NO	AG	ED	YE	PE	AI	NB	BW	BCB	AS	RV	NV	MV	Day 1	Day 2	Day 3
1	1.1	2.2	3.1	4.2	5.2	1.2	2.1	3.2	4.1	5.1	6.1	7.1	33	39	33
2	1.1	2.2	3.1	4.2	5.2								33	39	33
3	1.2	2.1	3.3	4.2	5.2								33	39	34
4	1.1	2.2	3.2	4.2	5.2	1.2	2.1	3.2	4.1	5.1	6.1	7.1	34	36	36
5	1.1	2.2	3.2	4.1	5.2								34	33	38
6	1.1	2.2	3.2	4.2	5.2								34	40	37
7	1.1	2.2	3.2	4.2	5.2	1.2	2.1	3.2	4.2	5.2	6.1	7.1	36	32	29
8	1.1	2.2	3.1	4.2	5.2								36	35	32
9	1.1	2.2	3.2	4.2	5.2								30	35	35
10	1.2	2.2	3.2	4.1	5.2	1.2	2.2	3.1	4.1	5.2	6.2	7.2	36	33	37
11	1.1	2.2	3.1	4.2	5.2								30	39	48
12	1.2	2.1	3.3	4.2	5.2								34	40	43
13	1.2	2.2	3.1	4.2	5.2	1.2	2.2	3.1	4.1	5.1	6.1	7.1	34	39	36
14	1.1	2.2	3.1	4.2	5.2								36	32	34
15	1.2	2.2	3.1	4.2	5.2								33	33	34
16	1.2	2.1	3.3	4.2	5.2	1.2	2.1	3.1	4.1	5.1	6.1	7.1	36	35	31
17	1.2	2.2	3.1	4.2	5.2								33	32	36

18	1.1	2.2	3.1	4.2	5.2								30	35	32
19	1.2	2.2	3.2	4.2	5.2	1.2	2.2	3.1	4.1	5.2	6.1	7.1	32	35	35
20	1.2	2.1	3.3	4.2	5.2								36	33	37
21	1.2	2.1	3.3	4.2	5.2								34	36	47
22	1.2	2.1	3.3	4.2	5.2	1.2	2.2	3.1	4.1	5.1	6.2	7.1	30	39	47
23	1.2	2.2	3.1	4.2	5.2								34	39	38
24	1.2	2.1	3.3	4.2	5.2								34	40	44
25	1.2	2.2	3.2	4.2	5.2	1.2	2.2	3.1	4.1	5.1	6.1	7.1	36	33	37
26	1.2	2.2	3.1	4.2	5.2								34	39	35
27	1.1	2.2	3.2	4.2	5.2								33	32	35
28	1.2	2.1	3.3	4.2	5.2	1.2	2.1	3.1	4.1	5.1	6.1	7.1	36	31	32
29	1.1	2.2	3.2	4.2	5.2								30	39	23
30	1.2	2.2	3.2	4.1	5.1								33	32	38

APPENDIX - XVI

PHOTOGRAPH DURING DOCUMENTATION OF ASSESSMENT SCORE



